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Responsive to 24 March 2006 Office Action

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REMARKS

This paper is responsive to any Office Actions indicated above and below,
and is responsive in any other manner indicated below.

INCOMPLETE OFFICE ACTION

The 24 March 2006 Office Action is INCOMPLETE, in that such action does
not mention or examine Applicant's claims 63-67. In view of Applicant's claims 63-67
not having been examined, it is respectfully submitted that it would not be
proper to make any next (e.g., replacement) Office Action final.

STATEMENT OF SUBSTANCE

The 22 June 2006 telephone interview with the Examiner is respectfully
acknowledged. During such interview, the Examiner agreed that the 24 March 2006
Office Action was incomplete in not having examined Applicant's claims 63-67, and
the Examiner indicated that he would issue a replacement Office Action.

DISCLOSURE OBJECTION/AMENDMENT(S)

The disclosure has been objected to because of the Office Action concerns
listed within the section numbered "2" on page 2 of the Office Action. As the
disclosure has been carefully reviewed and has been amended where appropriate in
order to address each of the Office Action listed concerns, reconsideration and
withdrawal of the objection to the disclosure/specification are respectfully requested.

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PENDING CLAIMS

Claims 43-67 were pending, under consideration and subjected to examination in the Office Action. Appropriate claims have been amended and added herein to adjust a clarity and/or focus of Applicant's claimed invention. That is, such changes are unrelated to any prior art or scope adjustment, and are simply refocused claims in which Applicant is presently interested. At entry of this paper, Claims 43-67 remain pending for consideration and examination in the application.

REJECTION UNDER '112, 2ND PAR. - TRAVERSED

Claims 43-36 have been rejected under 35 USC '112, second paragraph, as being indefinite for the concerns listed within the section numbered "4" on page 2 of the Office Action. Applicant respectfully traverses, because there was no antecedent problem within the prior versions of claim 43, i.e., Applicant's "light components" were being first introduced within the claim at the objected-to line 11, and accordingly, there was no need for antecedent for such term within the claims. In any event, in view of the present clarifying amendments to Applicant's claim 43, it is respectfully submitted that such objected-to "light components" no longer exists within the claim, and therefore the rejection has been obviated. As the foregoing is believed to have addressed all '112 second paragraph concerns, reconsideration and withdrawal of the '112 second paragraph rejection are respectfully requested.

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ALL REJECTIONS UNDER 35 USC §§102 AND 103 - TRAVERSED

All 35 USC rejections based upon Chadwick *et al.* (5,085,517) are respectfully traversed. However, such rejections have been rendered obsolete by the present clarifying amendments to Applicant's claims, and accordingly, traversal arguments are not appropriate at this time. However, Applicant respectfully submits the following to preclude renewal of any such rejections against Applicant's clarified claims.

All descriptions of Applicant's disclosed and claimed invention, and all descriptions and rebuttal arguments regarding the applied prior art, as previously submitted by Applicant in any form, are repeated and incorporated herein by reference. Further, all Office Action statements regarding the prior art rejections are respectfully traversed. As additional arguments, Applicant respectfully submits the following.

It is well known in the manufacturing art, that regardless of how many consistency controls are implemented, resultant manufactured items will always slightly differ from one another. For example, if 100 automobiles are built at the same time on the same manufacturing line, each automobile will vary slightly from one another. Such differences are attributable, for example, to variations in the manufacturing line over time (e.g., varying voltages, temperatures, etc.).

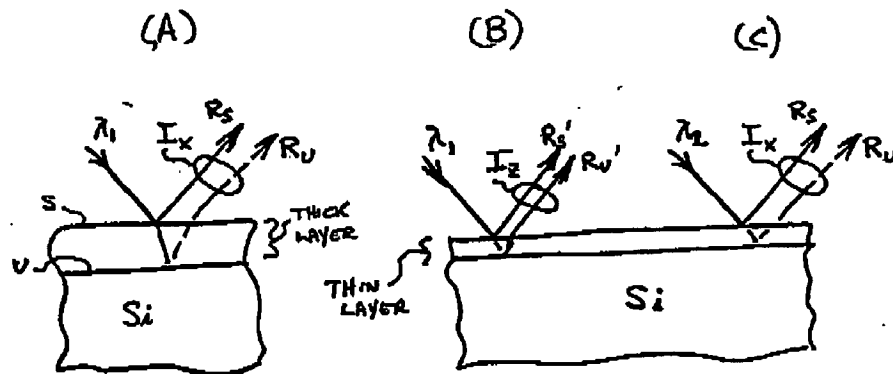
Inconsistencies likewise occur in manufactured semiconductor products. For example, a thickness of layers formed on a substrate tend to vary from item-to-item (e.g., wafer-to-wafer, die-to-die).

Applicant's disclosed and claimed invention is directed toward arrangements for inspecting specimens, e.g., semiconductor wafers, dies, LCD panels, etc. For an

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understanding of an important part of Applicant's invention, attention is directed to the simplistic sketch (A) shown below:



Shown in sketch (A) is a partial cross-section of a silicon wafer or die having a thick layer disposed thereon, with the layer having a surface S and an undersurface U. During inspecting, if a light of a first wavelength λ_1 is directed onto the surface, a portion of the light will reflect (shown by R_s) from the surface S, and another portion will refract through the layer and reflect (shown by R_u) from the undersurface U. The combination of R_s and R_u represents a reflectance, whereas interaction between R_s and R_u represents an optical interference I_x .

At this point of discussion, it is useful to note that Applicant is utilizing the term "optical interference" in a specific technical sense. More particularly, page 1378 of "VanNostrand's Scientific Encyclopedia", fifth edition, copyright 1976, describes "optical interference" as "...a beam of radiation may be separated into two parts, which follow different paths and are then brought back to form a single beam. Unless the two paths are of identical optical length, the two beams may not be in phase, and can destructively interfere at some points (dark) and constructively

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interfere at other points (bright)." Applicant respectfully adopts such description/definition.

Applicant found that substantially preventing interference I_x of lights reflected from the specimen by the illuminating, resulted in a best inspection image. However, Applicant's found that while use of light of a first wavelength λ_1 might substantially prevent interference I_x on one specimen, it might not prevent interference on a next specimen.

More particularly, sketch (B) is a partial cross-section of same type of silicon wafer or die product, but having differing layer, i.e., a thin layer disposed thereon due to manufacturing variation. If the light of the first wavelength λ_1 is again directed onto the surface, it was found by the inventors that differing levels of reflectance (combination of R_s' and R_u') and interference I_z will occur due to the thickness variation. Such differing interference is disadvantageous in that, while a good inspection imaging result might occur from with respect to the first sketch (A) "thick" layer example, a degraded imaging result occurs with respect to the sketch (B) "thin" layer example in that interference is no longer prevented.

Through further analysis/experimentation, the inventors found that while the reflectance and interference varied with varying layer thicknesses, the inventors further found that reflectance and interference could also be varied by varying a wavelength λ of the light applied to the specimen. That is, referencing sketch (C), if light of a carefully-selected second wavelength λ_2 was instead directed onto the thin-layer surface, it was found by the inventors that the same levels of reflectance (combination of R_s and R_u) and interference I_x as occurred with respect to the sketch (A) "thick" layer example could be made to be substantially duplicated with respect

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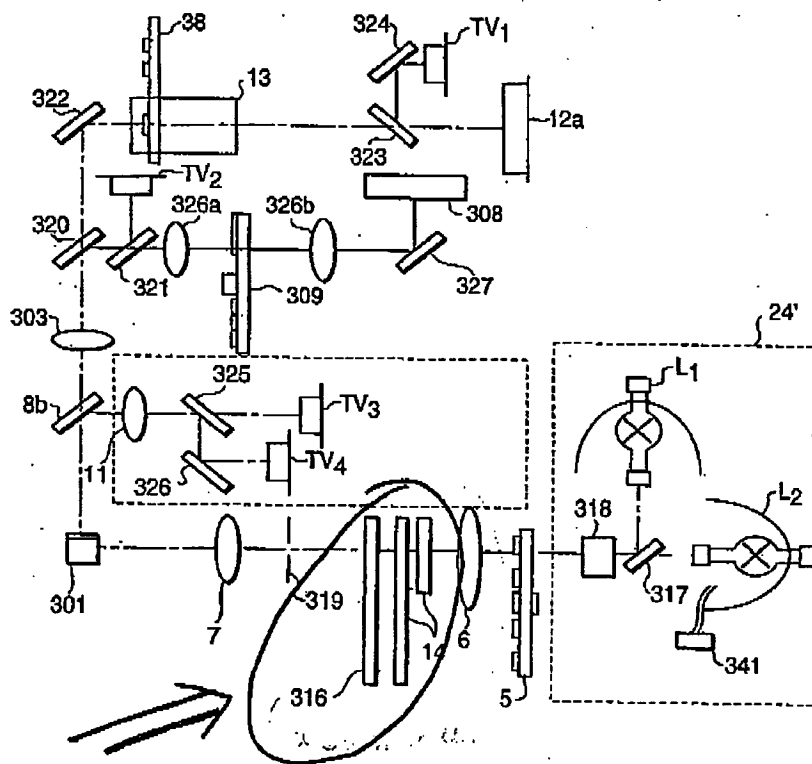
to the sketch (C) "thin" layer example, i.e., the interference I_x could again be substantially prevented. Such is important in that a good inspection imaging result can be obtained from specimen-to-specimen (e.g., wafer-to-wafer, die-to-die).

Accordingly, an important part of Applicant's disclosed and claimed invention is the selection of light components having a predetermined wavelength range for substantially preventing interference of lights reflected from the specimen. Such feature is supported in Applicant's specification, for example, at page 19, line 20, through page 20, line 7. In practice, Applicant accomplishes the same using a selectable filter. For example, Applicant's FIG. 33 (reproduced ahead) contains a selectable filter unit 316 (see circled area) which allows selection of wavelengths from the broadband light source 24'.

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FIG. 33



In terms of claim language, Applicant's independent claim 43, for example, contains the feature/limitations: "wherein, in the illuminating, selection of the selected wavelength or wavelengths of the light is made so as to substantially prevent optical interference of lights reflected from the specimen to form the image, where the optical interference is affected by a variation of thickness of the optically-transparent film formed on the specimen." Thus, it is respectfully noted that Applicant's clarified claims now specifically recite that the optical interference (and thus the selected wavelength or wavelengths) is affected by a

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variation of the optically-transparent film from specimen to specimen. Other ones of Applicant's claims have similar or analogous limitations.

Turning now to precluding the previously-applied Chadwick *et al.* '517 patent, Chadwick *et al.* does not disclose (or suggest) Applicant's invention, in that **Chadwick *et al.* nowhere discloses any type of teachings toward preventing interference.** Instead, Chadwick *et al.* appears mainly directed to utilizing wavelengths between 500 and 575 nm to improve a reflectivity of copper wiring lines during inspection imaging (see, for example, Chadwick *et al.*'s column 12, lines 15-42).

By constantly utilizing wavelengths between 500-575 nm, Chadwick *et al.*'s arrangement would be plagued by the above-describe example of using the same wavelength with both the sketch (A) and sketch (B) thicknesses. That is, an interference and/or reflectance of Chadwick *et al.*'s imaging would vary drastically as specimens with varying layer thicknesses were encountered. In short, Chadwick *et al.* appears mainly concerned with **maximizing reflections from a surface of copper lines,** without any regard to layer thicknesses.

In order to properly support a §102 anticipatory-type rejection, any applied art reference must disclose each and every limitation of any rejected claim. The applied art does not adequately support a §102 anticipatory-type rejection because, at minimum, such applied art does not disclose (or suggest) the above-discussed limitations of Applicant's claims.

Office Action comments appear to take a position that it is "inherent" that Chadwick *et al.*'s "selected wavelengths would prevent the interference light from the reflected surface". **Traversal is appropriate in a number of regards.** Applicant's

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invention is directed toward selecting the selected wavelength or wavelengths "to substantially prevent optical interference of lights reflected from the specimen", while Chadwick et al. is directed toward utilizing wavelengths between 500 and 575 nm to improve a reflectivity of copper wiring lines during inspection imaging (see, for example, Chadwick et al.'s column 12, lines 15-42).

There is no certainty as to whether or not optical interference does or does not occur within the Chadwick et al. arrangement, i.e., there are a large number of variables (e.g., component spacings, etc.) which would affect whether or not any optical interference does occur. There is certainty, however, that Chadwick et al's disclosure nowhere mentions optical interference. As a result of the above, it is respectfully submitted that the Examiner is merely speculating (claiming "inherency") that optical interference prevention occurs.

In traversal, the decision of *In re Robertson*, 49 USPQ2d 1949 (Fed. Cir. 1999), stated that to establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter **is necessarily present** in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." Moreover, the Court pointed out that inherency, however, **may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.**

The Examiner states "Chadwick et al. teaches the use of a selected wavelength range for detecting the defects of pattern wafer which is similar to wavelengths used by the present invention and also teaches that the use of a color filter permits selection of different filters to optimize the inspection of different

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materials; thus, it is inherent that the selected wavelength would prevent the interference light from the reflected surface.” Even assuming arguendo (for discussion purposes) that Chadwick et al. uses the same wavelengths and selectable filter as Applicant, such would have to be applied to exactly the same semiconductor product in order to get the same results. Applicant's “specimen” (i.e., die) is described/claimed as having “having an optically-transparent film thereon”. In contrast, Chadwick et al is directed to inspecting “printed wiring boards (PWB)” without any apparent optically-transparent film thereon. Chadwick et al. utilizes its wavelengths between 500 and 575 nm to improve a reflectivity of copper wiring lines during inspection imaging, and there is no certainty as to whether or not optical interference does or does not occur. Just because one is selecting and applying 500-575 nm wavelengths to improve copper reflectivity does not mean that an optical interference situation necessarily occurs. Accordingly, it is respectfully submitted that the Examiner's use of “inherency” to support the rejection is improper.

Even assuming arguendo (for discussion purposes) that the multitude of conditions (e.g., component spacings) are correct such that an optical interference situation does occur with one or even a few situations with the Chadwick et al. arrangement, in traversal, it is respectfully submitted that accidental unappreciated prior art achievements of an invention have been held not to anticipate or make obvious an invention. More particularly, regarding anticipation, it has been held that an accidental achievement of a product or process does not constitute proper anticipation. In support of such holding, it has been held that a true accident

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is never fully understood and gives no assurance that the same result can be achieved by others at a later time. The only assurance that Chadwick *et al.*'s disclosure gives, is that a reflectivity of copper will be improved by using 500-575 nm wavelengths, i.e., there is no assurance that any optical interference situation will occur. Attention is directed to the relevant article of Kilyk, "Accidental Prior Use", 64 J.PAT.OFF.SOC 392 (1982) and the relevant legal cases of Tilghman v. Proctor, 102 U.S. 707, 26 L.Ed. 279 (1881) and Eibel Process Company v. Minnesota & Ontario Paper Company, 261 U.S. 45, 67 L.Ed. 523, 43 S.Ct. 322 (1923).

In addition to the foregoing, the following additional remarks from Applicant's foreign representative are also submitted in support of traversal of the rejection and patentability of Applicant's claims.

One of the differences from Applicant's invention from Chadwick *et al.*'s is Applicant's selecting of a wavelength of the illumination light to prevent an interference of lights reflected from a surface and a bottom of an optically-transparent thin film formed on a surface of the specimen. See Applicant's specification page 19, last paragraph, to page 20, first paragraph.

At column 12, lines 10-21 of Chadwick *et al.*, it is written that the selection of the wavelength is to optimize the contrast between the resist and the copper. And also, it is written that a resist appears dark while the copper appears bright by selecting the wavelength between 500-575 nm. However, Chadwick *et al.* does not reference any interference of lights reflected from the surface of the resist and the bottom, or elsewhere. Accordingly, Applicant respectfully submits that Chadwick *et al.* is silent about preventing an interference of lights reflected from an optically transparent thin film formed on a surface of the specimen.

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As a result of all of the foregoing, it is respectfully submitted that the applied art would not support a §102 anticipatory-type rejection (or §103 obviousness-type rejection) of Applicant's claims. Accordingly, reconsideration and withdrawal of the Chadwick *et al.* '517 rejection(s), and express written allowance of all of Applicant's presently-pending claims, are respectfully requested.

RESERVATION OF RIGHTS

It is respectfully submitted that any and all claim amendments and/or cancellations submitted within this paper and throughout prosecution of the present application are without prejudice or disclaimer of any scope or subject matter. Further, Applicant respectfully reserves all rights to file subsequent related application(s) (including reissue applications) directed to any/all previously claimed limitations/features which have been subsequently amended or cancelled, or to any/all limitations/features not yet claimed, *i.e.*, Applicant continues (indefinitely) to maintain no intention or desire to dedicate or surrender any limitations/features of subject matter of the present application to the public.

EXAMINER INVITED TO TELEPHONE

The Examiner is invited to telephone the undersigned at the local D.C. area number of 703-312-6600, to discuss an Examiner's Amendment or other suggested action for accelerating prosecution and moving the present application to allowance.

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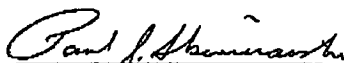
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CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that the claims listed above as presently being under consideration in the application are in condition for allowance. Accordingly, early allowance of such claims is respectfully requested.

whatever other extent is actually required, Applicant respectfully petitions for an extension of time under 37 CFR §1.136. Please charge any actual and appropriate deficiency in fees to Deposit Account No. 01-2135 (as Case No. 501.33745CX4), and please credit any refund of fees to such Deposit Account.

Respectfully submitted,



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